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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,295	04/01/2004	Peter Chou	GS 200	8562

27774 7590 04/27/2005

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EXAMINER

GEBREMARIAM, SAMUEL A

ART UNIT PAPER NUMBER

2811

DATE MAILED: 04/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary

Application No.

10/816,295

Applicant(s)

CHOU ET AL.

Examiner

Samuel A. Gebremariam

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 6-13 and 15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-13 and 15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 February 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the U-groove as recited in claim 10 must be shown or the feature(s) canceled from the claims.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3, 6 and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams et al., US patent No. 6,307,755.

Regarding claim 1, Williams teaches (fig. 20A) a semiconductor device, comprising a bottom lead frame (500), a die (510) attached on the bottom lead form; a top finger (502) attached to the die, wherein the top finger has a groove (notch 508), wherein the groove is provided at a bottom surface of the top finger and adjacent to a contact position between the top finger and the die; and a molding compound (501) for molding the semiconductor device.

Williams does not teach the groove in the top finger contains conductive material that flowed into the groove upon attaching the top finger to the die.

However Williams teaches in figure (28A-28E and also refer to col. 21, lines 59-67 and col. 22, lines 1-10) where a groove (notch) is used to catch excess solder material to avoid lead-to-lead short.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the mechanism where the groove receives excess solder material as taught in figures (28A-28E) into the embodiment of figure 20A in order to prevent shorting between leads (col. 22, lines 1-9).

Regarding claim 2, Williams teaches substantially the entire claimed structure of claim 1 above the top finger is attached to the die with a conductive material (col. 20, lines 41-58).

Regarding claim 3, Williams teaches substantially the entire claimed structure of claims 1 and 2 above including the conductive material is a solder (col. 20, lines 41-58).

Regarding claims 6 and 11, Williams teaches substantially the entire claimed structure of claims 1 and 9 above except explicitly stating that the groove is a V-shaped groove.

Change in shape is recognized as being within the level of ordinary skill in the art. It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a V-shaped notch in the structure of Williams, since such a modification would have involved a mere change in the shape of a component. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to form a V-shaped groove in structure of Williams in order to prevent shorting between leads.

Regarding claims 9 and 12, Williams teaches substantially the entire claimed structure of claims 1-3 above including the groove (508) provided in a bottom surface of the finger portion is adjacent to a contact position between the finger (502) portion and the die (510).

Regarding claim 10, Williams teaches substantially the entire claimed structure of claim 9 above including the groove is a U-groove (refer to fig. 20A).

Regarding claim 13, Williams teaches substantially the entire claimed structure of claims 1, 3 and 9 above including the conductive material is a solder.

4. Claims 7, 8 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams in view of admitted prior art.

Regarding claims 7 and 15, Williams teaches substantially the entire claimed structure of claims 1 and 9 above except explicitly stating that the semiconductor device is a rectifier.

Admitted prior art teaches (fig. 1) a package structure where the device is a rectifier.

It would be obvious to one of ordinary skill in the art at the time the invention was made to incorporate the rectifier device taught by admitted prior art in the structure of Williams in order to form a package for a rectifier.

Regarding claim 8, Williams teaches substantially the entire claimed structure of claim 1 above including the groove is located closer to a point of contact between the top finger and the die than a passivation ring of the die (fig. 1, admitted prior art).

Response to Arguments

5. Applicant's arguments filed on 2/7/05 have been fully considered but they are not persuasive. Applicant argues that the Williams reference fails to teach or suggest the device recited in amended independent claim 1 and 9. Namely, the structure of the lead frames and die is different from that of Williams.

Amended claims 1 and 9 only recite a semiconductor device, comprising a bottom lead frame; a die attached on the bottom lead frame; a top finger attached to

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said die, wherein said top finger has a groove, wherein the groove is provided at a bottom surface of said top finger and adjacent to a contact position between said top finger and said die and the groove, and wherein the groove in said top finger contains conductive material that flowed into the groove upon attaching said top finger to said die; and a molding compound for molding the semiconductor device.

Referring to fig. 20A of Williams structure, Williams clearly teaches a bottom lead frame (500), a die (510) attached on the bottom lead form; a top finger (502) attached to the die, wherein the top finger has a groove (notch 508), wherein the groove is provided at a bottom surface of the top finger and adjacent to a contact position between the top finger and the die; and a molding compound (501) for molding the semiconductor device.

Williams fails to teach the groove in the top finger contains conductive material that flowed into the groove upon attaching the top finger to the die.

However Williams teaches in figure (28A-28E and also refer to col. 21, lines 59-67 and col. 22, lines 1-10) where a groove (notch) is used to catch excess solder material to avoid lead-to-lead short.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the mechanism where the groove receives excess solder material as taught in figures (28A-28E) into the embodiment of figure 20A in order to prevent shorting between leads (col. 22, lines 1-9).

There appears no structural difference between the claimed invention and the Williams reference. Therefore applicant's argument is rendered moot.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel A. Gebremariam whose telephone number is (571) 272-1653. The examiner can normally be reached on 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAG
April 20, 2005



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SUPERVISORY PATENT EXAMINER
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